Selecting Locations for Hydrogen Infrastructure

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Honda Has Relevant Infrastructure Experience

- Relevant CNG Vehicle / Infrastructure experience - Civic GX
  - Gaseous Fueling
  - Dedicated Alternative fuel vehicle (Dependent on a limited station network)
  - Fleets and Retail Consumer markets
- Relevant FCEV Vehicle / Infrastructure experience - FCX
  - 1st fleet customer deliveries - 2002, Two year lease
  - 1st retail consumer deliveries - 2005, Two year lease
- Honda FCX Clarity - 2008 to present
  - 1st vehicle manufactured exclusively as a FCEV
  - 1st market outreach for retail consumers "handraisers"
  - 1st FCEV retail dealership network (sales and service)
  - 1st customer deliveries from dealers, Three year lease

- Real-World retail consumer experience & feedback
  - Vehicle satisfaction
  - H2 Station interaction: Convenience & satisfaction
  - Vehicle use & commute patterns, destinations, driving habits

Honda's Infrastructure Learnings / Experience

- Customers and Vehicles Chasing Stations
  - Example: Santa Monica Shell & UC Irvine
    - Single station in market, low capacity, single dispenser hose
  - Lessons Learned: No backup, No redundancy = Risk of failure
  - Needed a new model: Stations designed for customers / markets
- Process – work collaboratively towards common goals
  - New Model: UC Davis (ITS) and UC Irvine (STREET)
  - Common Problems / Shared Interests: CAFCP, other OEMs
  - Share learnings with funders: CARB, CEC + AQMD's & DOE
- Guiding Principles in All discussions
  - Technology neutral
  - Vendor / Supplier neutral
  - Customer needs driven
- Results
  - Cluster / Network / Destination Concept (See CAFCP Roadmap)
    - Need for redundancy / backup
    - Need for destinations and connectors

The New Model for H2 Infrastructure

- Market-Oriented Station Locations
  - Hand raisers, market data (OEM proprietary information)
  - ~ 6 minutes or less from residence (research / experience)
  - Income / Technology Intenders (HEV's, CNG, BEV's)
  - Major streets / Thoroughfares: "Coverage"
- Consumer Focused Stations
  - Credit Card Access, 24/7 (a must)
  - Clean; Well Lit, easy ingress / egress
  - Easy user interface (PIN's / Screens)
  - Multiple hoses / Simultaneous fills
  - 350 & 700 bar, high-quality fills: "Capacity"
- Current PON Process is basically sound, needs annual continuous improvement
  - CAFCP Roadmap & components provide additional guidance

OEM Expectations for Hydrogen Stations

- Examples, but not complete or inclusive list of needs
  - Provide SAE J2601 H70 Type A, and non-precooled H35 fills
  - Meet SAE J2719 fuel quality specifications
  - Minimum Capacity Recommendations:
    - Optimized sufficiently for the location based on projected load, station type (market, connector, destination) etc.
  - Offer multiple dispensers per station, independent control / user interface, simultaneous use of each hose.
  - Minimum ending SOC: 95%
  - Point of sale built in - DMS Certified
  - No access agreements or other use contracts

Frequent consultation with OEMs will assure that differences can be ironed out before construction begins. OEMs really represent the voice of the customer.

Suggestions for CEC PON Process Improvement

- Prioritization of Locations
  - Gaps exist between OEM Location "Recommendations" vs Awards
    - Please heed suggestions and definitions in OEM support letters - Primary and Secondary locations already identified
    - Heed the collective voice of OEM's - "The Voice of our Customers"
      - Example: 2nd year, denied San Diego connector / destination request
  - Utilize third-party: UCI with STREET "PLUS" model
    - Priority Location & Utilization Selection
      - Consolidated OEM priority with enhanced DATA for STREET
- Prioritization of Construction
  - Urgency of immediate need: Impact on customers
    - Heed the collective voice of OEM's
      - Example: Santa Monica - "Single Hose, Limited Capacity" serving 100% of the Honda Clarity customers in the cluster: "One moment from failure"
- Feedback Process
  - Implement a "final check" to confirm locations, irrespective of vendor or technology
  - Question EVERYTHING you do not understand.. until you do

BLUE SKIES FOR
OUR CHILDREN

HONDA

Question #1

- **Approaches for selecting the locations of hydrogen fueling stations for California's hydrogen infrastructure network strategy**
  - **Honda supports the Cluster Concept for matching stations with customers**
  - **Clusters Began organically with the first true "public" 24/7 stations, Shell Santa Monica and UC Irvine.**
    - **Single station does not make a market, therefore surrounding these initial sites with stations for:**
      - **Backup**
      - **Redundancy**
      - **Customer Convenience (options)**
    - **Market information such as customer demographics, "green vehicle" purchase %, UCI Street modeling, customer "handraiser" data.**
    - **Identification of freeway access, corridors, proximity to customer residence**
    - **Voice of customer (Customer surveys, asking "where would you like to see the next hydrogen stations built"**
  - **The CAFCP Roadmap incorporates many aspects of data and information and recognizes UC Irvine STREET modeling for station selection. Honda supports both STREET and the CAFCP Roadmap.**

Question #2

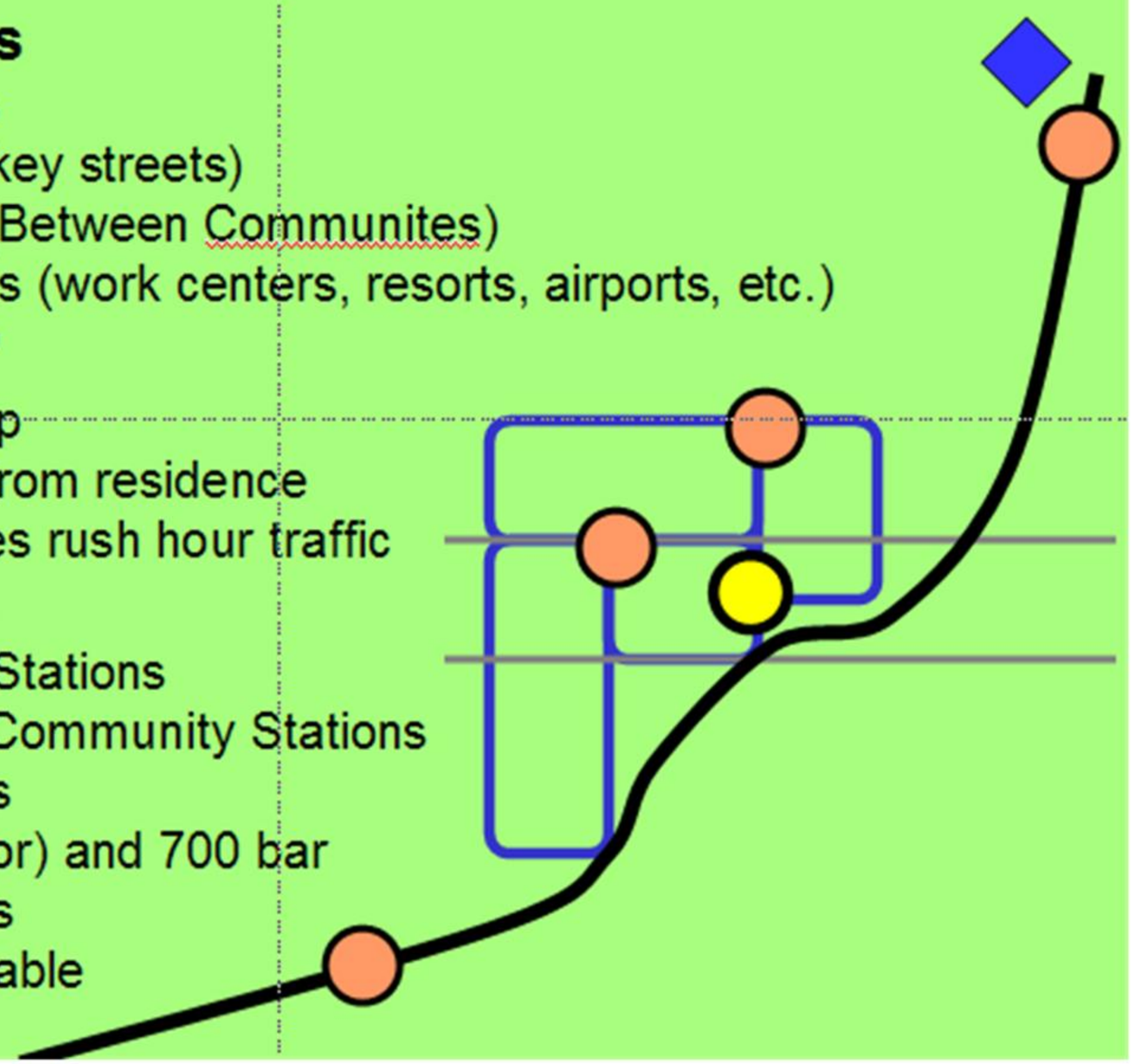
- **Existing research about how to optimize the selection of potential hydrogen fueling station locations**
  - **Mapping of other Honda / Competitors vehicle sales (Hybrids, CNG, BEV)**
  - **OEM Market Data**
  - **Voice of customer surveys**
  - **Utilize 3rd party (such as UC Davis ITS studies, UC Irvine STREETS "Plus" additional data from OEM's, research firms)**

Question #3

- **Definition of clusters, connector stations and destination stations. Identification and definition of other regional prioritization concepts**

Market Driven Infrastructure

- **Begin with Markets**
  - Identify Communities
  - Consider Corridors (key streets)
  - Consider Highways (Between Communites)
  - Consider Destinations (work centers, resorts, airports, etc.)
- **"Cluster Concept"**
  - Redundancy / Backup
  - Primary - 5 minutes from residence
  - Backup - ≤ 15 minutes rush hour traffic
- **Consider Stations**
  - "Marquee" or Image Stations
  - Smaller Convenient Community Stations
  - Destinations & Nodes
  - Mix of 350 bar (anchor) and 700 bar
  - Diverse Technologies
  - Diverse Sizes, Scaleable



Question #4

- **Role of automakers' fuel cell vehicle sales projections in hydrogen infrastructure siting and award selection**
  - **Coverage first (Customer Driven)**
    - **"Where the customers are" and "Where the customers want to go"**
    - **Handraiser information is studied carefully, survey questions validate suitability**
  - **Capacity second (Post-ownership, customer satisfaction)**
    - **Customer satisfaction driven**
      - **Quality of fill (consistent vehicle range)**
      - **Simultaneous fills (no waiting for another driver)**
      - **POS / User Interface is simple, Credit Card payment**

Question #5

- **Other ideas and recommendations on hydrogen infrastructure siting**
  - **Continuous improvement of the process.**
    - **"Deming Like" quality improvement: Plan, Do, Check, Act. (repeat)**
  - **Build on existing work with UC Irvine "STREET-PLUS"**
    - **Location and utilization research, add input for even better results**

Question #6

- **Other issues related to hydrogen fueling infrastructure location or the design of a solicitation**
  - **Must have multiple dispensers with simultaneous refueling capability**
    - **It would be insane to believe customers should have to wait for another fuel cell vehicle to fill before they could start filling their own car**
  - **Point of sale**
    - **Dispensers MUST have POS capability now. Not if, just *when* DMS approval occurs**
  - **Technical requirements are a given, minimum standard to meet**
  - **No special contracts or agreements by either OEM's or their customers**
  - **Destinations identified by OEM's and CAFCP are critical for initial customer acceptance "on the showroom floor".**

Additional Questions

- How do automakers see their role in the process?
  - A: Critical, voice must be heeded
- How do we get automakers' market data into our selection process?
  - A: It is today, reflected in the OEM support letters and STREET. There is an opportunity to use additional / enhanced market data for input to UC Irvine STREET, hence STREET PLUS